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ANNUAL REVIEW OF THE METAL TRADE.

The state of the Metal Market during the year 1869 has not been such as to afford much gratification to those engaged in it, or to be so satisfactory regarding profits as many that have been experienced in former years—indeed, the shadow of the great panic seems hardly yet to have passed away, and like some dark cloud has still hung most unpropitiously over the commerce of the country, and prevented its return to the activity which it used formerly to manifest. Various causes have probably united to create the general depression which has more or less characterised trade during the past year, some of them, doubtless, of a political nature, as it appears to be rather questionable whether some of the changes which have taken place in our fiscal relations with other countries may not have tended in some measure to the prevention of that progress in our own trade and manufactures which ought to be the first consideration of Government. However, upon this point meetings have taken place in many parts of the country for the discussion of this important question, and to arrive, if possible, at the true cause of the depression in the commerce of the country, and, when that cause is satisfactorily arrived at, to endeavour to devise some means to remedy the evil. Good, no doubt, will result from these discussions, and it is to be hoped some wise and well-digested means may be devised for the cure of the present depression in trade, and for placing the commerce of the country once more upon the firm basis upon which it formerly stood, and for the removal of everything which may stand in the way of its progress, and thus enable it to go forward with renewed energy and life. Early in the year there appeared some prospect of business assuming a more healthy tone, and at one time a really good amount was done, and several speculative transactions also occurred, which for a short time caused a good deal of liveliness in the market, and it was fully expected that the metal trade would recover from its state of dulness and inactivity, and once more resume its wonted animation. Unfortunately, however, this improved state of things did not last long. Speculative operations soon ceased, and business again relapsed into a condition of quietude, and this state of things has continued more or less throughout the whole year. At times gleams of brighter things appeared in the commercial horizon, but they were only evanescent, and were soon replaced by the accustomed appearance of dulness and inactivity. How much longer this state of things is to continue it is impossible to say, as at present there seems but little indication of any decided improvement in business. Eventually, there is no doubt, commerce will resume its former position, and emerging from the gloom will shine forth with accustomed splendour; and probably the period of depression through which it has passed may lead to its being settled upon a more substantial basis, and becoming yet stronger and more extended than it has ever been before. It is to be hoped that the lessons taught by the events of its late history may not be in vain, and that some of those causes which led to the depression in trade may for the future be avoided, and especially that the spirit of over-speculation which was so prevalent a few years since may not return, to be again the fruitful source of another commercial panic. One great cause of the want of activity in the metal trade has been the want of orders from India. It has usually been the case that from this great and important part of the empire orders have flowed in with great regularity and abundance, large quantities of various metals being taken in the course of the year, thus causing a considerable amount of activity in the market. During the past year, however, these orders have become exceedingly limited, mail after mail coming in, and bringing a few or no orders at all, and those that did arrive were generally very much reduced in extent. This has, consequently, seriously affected the trade. Fears were entertained at one time of a scarcity of food arising in India—a calamity which would destroy any expectation of improvement arising. Recent accounts, however, have been more favourable, and there appears some hope that a more satisfactory state of things will arise, and that probably in the spring of next year an improved demand will ensue, which will result in more extended business being done with India. At the commencement of the year an important change took place in connection with the metal trade. For a long time it had been felt that the Royal Exchange, where former meetings of the trade had taken place, was exceedingly unsuitable and very uncomfortable, and that there were none of the facilities which are so essential to the energy of the present times. It was, therefore, determined that for the future the trade should meet at the Lombard Exchange News Room, which was in every way suitable for the purpose, and where every facility which the trade required was rendered. It has been found that this change has been very beneficial, and very conducive to the furthering of business, besides being much more comfortable to the members themselves; and the arrangement made for holding a 'Change at half-past one as well as half-past three o'clock has greatly facilitated transactions, and it is only matter of surprise that the trade so long consented to continue to use so very inconvenient a place as the Royal Exchange.

The prosecution of the directors of Overend, Gurney, and Co. has been an event of great interest to the commercial world, and the revelations which have taken place during the examination before the Lord Mayor of the manner in which their business was conducted has excited the greatest surprise; and it is now only matter of wonder that the public generally should have been so eager to take shares in a concern so thoroughly rotten and unsound; and as the breaking up of the concern was so intimately connected with the great panic, it is not to be wondered at that great and lively interest is felt in the trial before the Lord Chief Justice, which resulted in the acquittal of the directors from the charge of conspiracy to defraud made against them. One circumstance which took place during the year, at the same time, looked rather serious, and seemed to bode ill for the continuance of our peaceful relations with the United States—this was the rejection by that country of the Alabama Treaty for the settlement of the claims made by America in that matter. Very wild indeed were the expressions made by the statesmen of America, and very absurd indeed were the claims put forward by one prominent member of a certain party in the United States; indeed, so preposterous were they that their very absurdity was a proof that they never could be intended to be enforced. At this juncture a new Minister was appointed to represent America at our Court, and the public waited with some degree of anxiety to learn as soon as he arrived in this country what were the instructions he had received on the subject. It was found, however, when Mr.

Motley reached England that his instructions were perfectly harmless. He was directed to explain to the British Government the circumstances attending the rejection of the Alabama Treaty, without committing America to any particular policy. He was not to propose any settlement of claims, but to secure the temporary postponement of the question, hoping that when the then existing excitement should cease that England would invite a renewal of negotiations. He was not authorised to announce the readiness of the United States to make any propositions, or demand the payment of the claims, but to assure the British Government of the sincere desire of the United States to have the dispute adjusted upon terms honourable and satisfactory to both nations; and Mr. Motley, on his own behalf, stated that he fully appreciated the importance of amicable relations continuing between England and the United States. Thus the matter remains; and whether it will ever be settled or not is a question that is left for consideration at some future period; but it is of the greatest importance to the trade of both countries that nothing should arise to destroy the present harmony subsisting between them; and it is, therefore, to be hoped that eventually some arrangement may be come to by which the matter may be definitely put at rest, and that it should not be allowed to remain a continual sore between two nations which ought for so many reasons ever to remain at peace. The panic also which has recently taken place in the Gold Exchange at New York has been regarded with regret by all who desire to see America in a prosperous condition, and is another instance of the evils resulting from undue speculation; and the suspicion which attaches to some parties high in office in the Government of the United States does not speak well for the honour of public men in that country. It was matter, however, of satisfaction that the losses which have been sustained by some parties there had fallen principally upon speculators, and that the legitimate business of the country had in no way been interfered with. The uncertainty which at one time existed as to the health of the Emperor Napoleon was a source of much anxiety to all parties connected with commerce, as it was felt that should his illness terminate fatally great uncertainty would exist as to the position that France might occupy; and that should any change take place in the form of Government there a very unfavourable effect might be produced upon commercial affairs, and thus any progress which was likely to take place in business would be sure to be impeded. However, fortunately the Emperor's health was apparently re-established, and thus the fears entertained were not realised. It was matter of rejoicing that the disturbances which were anticipated in Paris on Oct. 26 did not arise, and though there was continued dissatisfaction expressed by some parties opposed to the Government, yet it was felt that the Emperor and his Government were too strong to be affected by these parties, and that whenever it should please the Emperor to put them down it was quite in his power to do so.

During the year the following alterations have taken place in the Bank rate of discount:—On April 1 it was raised to 4 percent., having previously stood at 3 percent.; again, on May 6 it was further raised to 4½ percent.; then, on June 10 it was reduced to 4 percent., and on June 24 further reduced to 3½ percent.; on July 15 again reduced to 3 percent.; and on Aug. 19 still further reduced to 2½ percent. At this rate it remained until Nov. 4, when it was raised to 3 percent., at which it now stands, being precisely the same rate as when the year opened. Taking the rate throughout the year it has been low, and by no means unfavourable to commercial operations; but, unfortunately, such has been the general depression in trade that it has had little or no effect in extending operations, although certainly it has had a much more favourable tendency than it would have done had the Bank minimum been high during the course of the year. It is matter of sincere regret that the year now closed has not proved more fruitful to the trade of the country, and that the anticipations entertained at its commencement of a more extended advancement towards commercial prosperity have not been realised; and we certainly shall have no cause to look back upon it with much satisfaction in a business point of view. We, therefore, hail the new year with the hope that during its course we shall have some of those hindrances removed which now appear to stand in the way of returning activity in trade, and that thus it will be found that there is still vitality and energy in our commerce, once more to rise from the depression in which it has so long remained, and to go forward in its onward course with increased determination, until it once more stands forth upon the pinnacle of prosperity it formerly occupied, and that at the close of the year there may be no longer any cause for despondency, but that a cheerful and satisfied feeling may have possession of all hearts that the year 1870 has been one of advancement and prosperity, and of perfect recovery from the unhealthy condition which is now to be deplored, in which case the year upon which we are now entering will be remembered with gratification and joy.

COPPER.—The past year has been by no means a favourable one for the copper trade, as it has been throughout in a very depressed condition; not only has the general demand been exceedingly limited, but the continued large supplies constantly arriving from Chili have exercised a very prejudicial influence upon the trade here, and quite prevented any rallying in prices, which have been exceedingly low throughout the year; and as long as these large quantities are continued to be poured in upon us from Chili it is quite impossible for the market here to present a more encouraging appearance. It is true that there has been a good demand existing from India and other quarters it might have been somewhat different, but even these large shipments would have kept the market down; but as this demand has not existed their effect has been most depressing, and we can only hope that before long there will be some diminution of them, and that the arrivals will become moderate in extent; and when this is the case there will be some prospect of beholding an improvement in the copper trade. At the commencement of the year, the shipments from Chili having been comparatively small, a rather better feeling occurred in the trade, and rather better prices were obtained. Chili bars were now selling at 73½, 10s. to 74½, cash, and 75½ for arrival; and as this improvement continued for a short time smelters advanced their prices to 81½, 10s., 82½, for tough cake and ingot, and 85½, 10s. for sheets and sheathing; Chili bars rose to 75½, cash, and 76½ to 76½, 10s. for arrival. This improvement did not last long, and at the beginning of February the market was without activity, and the quotation for Chili bars fell to 74½, cash, and 74½, 10s. for arrival. The next advices from Chili, announcing charters for 2900 tons for this country, caused the market to become weaker, and English be-

came easier in price, while Chili bars declined to 73½, 10s. cash, and before the close of the month fell to 72½, 10s. cash. In March the advices from Chili stated the charters to be 3330 tons, 1600 tons being bar, and 1700 tons ore and regulus. The largeness of this quantity caused the market to become increasingly flat, and Chili bars were quoted at 71½, 10s. cash; and on March 10 the English smelters officially reduced their prices 3½, per ton, making them 78½, 10s. for tough cake, tile, and ingot; 80½, 10s. for best selected; and 82½, 10s. for sheets and sheathing, but as business had been already done upon lower terms these prices were merely nominal. The next advices from Chili announced charters for 2400 tons, of which 1100 tons were bar, and 300 tons ore and regulus, and business was done in Chili bars at 71½, English remaining the same. In April there was a little better feeling, in consequence of the advices from Chili being considered more favourable than the previous telegraphic information, so far as that the actual shipments were expected to be below the amount of charters, consequently holders were less willing to sell on previous terms. The demand became more active, and business in Chili bars was done at 71½, cash, and 72½, for arrival. Banca was quoted at 82½, and Wallaroo at 81½, 10s. English tough cake, also, was rather higher; 600 tons of regulus was sold at 14s. 3d. per unit, and 100 tons Chili bars for distant arrival realised 73½, to 73½, 10s.; and towards the close of the month about 700 tons were sold, at prices from 72½, 10s. to 73½, for cash, and 73½, 10s. to 74½, per ton for distant arrival. The demand for English manufactured was at this time only limited. The last week in the month, however, advices were received from Chili, advising charters for 2500 tons, which caused the market to become less firm, and the price of Chili bar went down to 71½, while the prices of English also became easier. In May a telegram from Chili announced charters for 2200 tons, which made the market still easier, Chili bar being quoted at 70½, cash, afterwards went down to 68½, 10s. and 68½, and on May 18 the English smelters announced a reduction of 2½, per ton, making prices 74½, for tough, cake, tile, and ingot, 76½, for best selected, and 78½, for sheets and sheathing; and after this was done the demand rather improved. Chili bar was now quoted 67½, 10s. to 68½, cash, and ore at 11s. per unit. Later in the month advices were again received from Valparaiso, announcing charters for 2500 tons, of which 1500 tons were bars and ingots, and 1000 tons ore and regulus. The market, however, was a little firmer, and smelters were generally well supplied with orders. In June the charters advised from Chili were 2900 tons. Towards the middle of the month a decided improvement took place in the market, a much better demand arose, and prices became firmer. About 500 tons of Chili bar sold at prices varying from 67½, 15s. to 68½, 5s. cash, and 69½, 10s. to 70½, for arrival. The next fortnightly advices from Chili announced charters for 2000 tons, and the market became more quiet, the transactions in English being very limited. In July further advices from Chili reported charters for only 1400 tons, in consequence of which the market became again rather firmer, and Chili bar was sold at 68½, cash. Considerable sales of ore took place at 13s. 9d. per unit. At the close of the month the next advices from Chili were for 2800 tons, and as this quantity showed no reduction in the supplies, the market was not favourably affected. For English manufactured a fair business was, however, done at 79½. In August charters for 3300 tons were advised from Valparaiso, and this large quantity had a prejudicial effect upon the market, and prices became somewhat easier. Business in Chili bar was now done at 67½, cash. Soon after, however, an improved demand sprung up, and a better business was done, and prices both of English and foreign became firmer. Chili bar was again quoted at 68½, and as the next advices from Chili announced charters for only 500 tons the market continued to improve, a much better business was done in English, and Chili bar advanced to 69½, cash. This improvement continued until in September, advices arrived from Chili stating the charters to be 2900 tons. This intelligence had the effect of at once retarding the improvement which had taken place, and operations which were in course became suspended; Chili bar receded to 67½, 10s., 68½, cash. The market now became very quiet, and transactions were very limited. In October advices came of another large quantity being announced for shipment—3400 tons—which as usual acted most unfavourably upon the market, which became very flat, and quotations were again lower. English tough cake in second hands was sold at 71½, in warehouse, Ore was quoted at 13s. 3d. to 13s. 6d. per unit, and Chili bar at 66½, 10s. to 67½, cash, and it was felt that as long as these heavy supplies continued to be poured in from Chili no hope of improvement in the market existed. This state of things continued until the close of the month, when advices from Valparaiso of the shipment of only 250 tons caused the market to become rather firmer, and Chili bar was quoted at 67½, 10s. cash. In November the market remained without change, and the amount of business transacted continued limited. Advices were received from Valparaiso by telegram, dated Oct. 3, stating the charters in the previous fortnight to have comprised 700 tons of ore and regulus and 80 tons of bar, and in consequence of the smallness of these shipments a better feeling arose, and holders made some advances in their prices, and Chili bar was quoted at 67½, 15s. to 68½, cash. Afterwards, however, the market became more quiet, and the price of Chili bar declined to 67½, 67½, 10s. cash, and ore to 13s. 3d. per unit. Towards the latter end of the month advices were received from Valparaiso, dated Oct. 17, reporting the charters to Oct. 15 to have been 500 tons of bar and 1300 tons of ore and regulus, but notwithstanding the smallness of this quantity the market remained inactive. English was obtainable under smelters' rates, Burra was sold at 73½, to 73½, 10s., and Chili bar was quoted at 66½, 15s. to 67½, ore remaining at 13s. 3d. per unit. In December the market still remained quiet, and transactions were not numerous; prices, however, remained tolerably steady, Chili bar was still quoted at 66½, 15s. to 67½, and ore at 13s. 3d. to 13s. 6d. per unit. Advices received from Valparaiso, dated Nov. 2, stated the charters in the last half of October to have been 3050 tons, with a stock on the coast of 2750 tons, and this intelligence tended to increase the flatness of the market, and prices became lower, although very little business was done, Chili bar was now quoted at 66½, to 66½, 10s. cash, and ore at 13s. to 13s. 3d. per unit.

IRON.—At the Quarterly Meeting of the Staffordshire Ironmasters, just before the commencement of the year, it had been decided to make no alteration in the list prices, but as this decision had been fully anticipated no effect was made upon the position of the trade. At this time there was rather a want of orders, but an improvement was expected before long. The works were not yet fully employed,

In February the trade was rather dull, only a few orders having been given out for export to India, the United States, and the Continent, home orders being still of small moment. Some of the ports usually closed at this season of the year were now open, which somewhat assisted the demand. The trade generally was dull during the month. In March it began to be feared that the expectation of an improvement in the demand during the quarter would not be realised, there were a few more orders from the United States, and the local consumption was fairly good, yet still the general demand was slack. At the close of the month the Preliminary Meeting of Ironmasters was held at Birmingham, but no alteration was made in list prices. In April there was rather an improvement in the demand, buyers making more enquiries, and the works were somewhat better off for orders, especially for hoops and sheets. On April 8 the Quarterly Meeting of Ironmasters was held at Birmingham. The attendance was large, and from the commencement of the meeting it was apparent that there was some slight improvement in the tone, although the spring orders had not come up to the expectations. Some of the makers were well supplied with orders, but others had not sufficient to keep all their mills going, though still doing what might be considered a fair amount of business under existing circumstances. In the main the feeling was one of hopefulness, and a confident belief was expressed that later in the year the demand would improve. During the month some of the ironmasters showed a disposition to share in the rail trade, which of late years had been abandoned by them, but the possibility of South Staffordshire making rails depended upon the price, which had lately advanced. In May orders still continued to come in slowly, and while most of the principal works were moderately, though not fully, employed, the smaller ones were, in most cases, very short of orders. The notification of the opening of the navigation to St. Petersburg, which was now made, gave hope of increased orders from Russia, and as the month advanced the demand from thence became very good. The demand for rails now became very good, and a considerable number of the larger works completed arrangements to roll this class of iron. The price left but little margin, but still it was considered worth while to take these orders, so as to keep the works going. Some of the makers, however, anticipating an advance in price, declined taking contracts for rails. In June the demand for most kinds of manufactured iron continued quiet. There were plenty of orders for rails, but for ordinary makes the demand was dull, and the general complaint was that the competition for orders was so close as to make it impossible to secure any profit. The demand for rails now became the great feature of the trade, and its extent was illustrated by the fact that the value of railway iron exported in April was nearly double what it was in the corresponding month of 1867, and 50 per cent. in advance of that of 1868, and this in spite of the great decline in the export of that class of iron to India. The trade now began to look more healthy, and there was a better demand for manufactured iron. On June 24 the Preliminary Meeting of Ironmasters was held at Birmingham. There was a good attendance, and a resolution was unanimously passed to adhere to the current scale of prices for all descriptions of manufactured iron. At very few of the works were all the mills and forges in full operation, but the trade was considered unquestionably in a better state than it was three months before. In July it was anticipated that as it had been decided to adhere to existing prices for another quarter, the demand for exportation would be well maintained. The home trade was still inanimate, but there was a more hopeful feeling as to shipping orders. The Quarterly Meetings of the Ironmasters were held at Wolverhampton on July 6, and at Birmingham on July 7. The attendance at both places was large, and the trade was well represented. Buyers were, however, but few in number, and those present appeared more desirous of ascertaining upon what terms contracts could be made than of entering into actual engagements. The general tone of the meetings was, however, more cheerful, and the impression appeared to be that there was a prospect of future improvement in the trade. In anticipation of quarter-day, orders had been sent to several of the principal makers, and the second-class firms were moderately well engaged, and from the tone of the meetings it did not appear that they were desirous of obtaining an accession of orders at such low prices as they would have accepted three months before. About this time the re-introduction of rail-making into South Staffordshire formed an element of some importance in the trade, one of the works turning out 500 tons per week. The general impression, however, was that the price paid would scarcely yield any profit whatever, and makers were not generally anxious to secure additional orders on present terms, but some were hopeful that the quality of Staffordshire rails would secure a higher price. In August there was a steady demand for finished iron. Rails for the Baltic were now pressed for completion, so as to be shipped before the close of the navigation. Further contracts for rails were now taken, and considerable orders might have been had at existing prices, should additional firms enter this branch of the trade. Orders to a fair extent now came to hand, and the demand slightly improved, and there was a general belief that there would be no falling off during the autumn. In September there was a steady continuance of orders, and some of the works were nearly fully employed, though a large proportion were not going more than three days a week, and it was feared that when it became too late to ship for the Baltic some falling off in the demand would be experienced. Prices of manufactured iron showed no improvement, except for rails, but in those it was confined to early delivery, which could not be undertaken. The workmen now began to agitate for an advance in wages, which the masters said was impossible so long as prices remained at the then existing rates; and about the middle of the month the delegates of the ironworkers decided to invite all the men to memorialise their employers for an advance of 1s. per ton for puddlers, and 10 per cent. for millmen. In October the demand for rails continued, and orders for Russian rails were still to be obtained for speedy delivery, but the works were too full to entertain any fresh orders for immediate execution. Contracts for spring shipments were taken at enhanced rates, and it was fully anticipated that the requirements for this particular description of iron would keep the mills employed for some considerable time, and enable the ironmasters to command remunerative rates. At the Preliminary Meeting of Ironmasters it was determined to adhere to the old list prices, it being evident that the condition of the trade did not justify an advance, and it was expected that the agitation among the ironworkers for increased wages would not continue; this, however, was not the case, and the consequence was that on Oct. 28 a Special Meeting of the Ironmasters was held at Birmingham, in order to take into consideration certain points submitted to the trade by a section of the workmen, upon which they based their claim for an advance in wages. The attendance was large, and as it was thought that the puddlers were in a worse position than the men employed in other departments, their case engaged the attention of the meeting. After considerable discussion, during which it was stated that the present rate of wages is higher in proportion than the price of iron, it was thought desirable to avoid anything which may tend to risk the prosperity of the trade hereafter, which a contest with the men would be sure to do; and, therefore, it was unanimously resolved to offer the puddlers an advance of 6d. per ton, the same to take effect from Nov. 1, and although the men asked 1s., it was considered that they would accept this offer until the price of iron went up. Unfortunately, however, this proposition did not answer, and on Nov. 4 another Special Meeting of the Ironmasters was held at Birmingham, which was rendered necessary by the continued demands of the men for an advance of wages, and their threats to strike if the demand was not complied with. There was a very animated discussion at the meeting, and considerable difference of opinion was expressed. Ultimately, however, it was resolved that the price of manufactured iron be advanced 20s. per ton; and as to wages, that those of the puddlers be advanced 1s. per ton, and the millmen and others to have a rise of 10 per cent. This advance to date from Nov. 1. It was stated that the trade was decidedly better, and it was presumed that the difficulty with the workmen would now pass over. This decision, however, was called in question in some quarters, as it was considered that although the demand for finished iron had improved it was not such as to justify the advance made, and it was soon found that only a few of the leading makers were able to maintain the officially declared advance of 20s. per ton, the actual advance obtainable by second-class houses varying from 5s. to

15s. per ton. In December most of the leading firms were still occupied with old contracts. It was considered too soon to estimate the probable effect upon the trade of the recent advance in price, as comparatively few orders had been given out at the new rates; a more hopeful view of things was, however, being taken by many of the principal ironmasters. The mills and forges continued to be fairly occupied in the production of finished iron at the old rates, but the number of orders coming in at the advanced scale was not considerable; most of the makers, however, had accepted orders before the advance sufficient to occupy them to the end of the year. In Welsh, the quietude which had prevailed in the trade for three or four weeks previous to the commencement of the year induced the ironmasters to make no change in list quotations. Home business was quiet, but there was a prospect that early in the year some large contracts would be given out. At the leading works the rail-mills soon began to be tolerably well employed, chiefly on American account. In February, a large quantity of iron was waiting for shipment to the United States and South America. Continental business was also promising as to the future. Home business began to move gradually. Several of the railway companies were offering contracts of from 1000 to 5000 tons, which were expected to be followed by others for larger quantities. The principal shipments were to the United States and South American markets, and advices from the States pointed to an increase in the demand before long. The home trade maintained its position, and the demand for railway iron was rather increased. In March the exports continued to increase, and the contracts on the books of the makers were sufficient to keep the rail-mills going for the next three months. Several vessels were now loading iron for the United States, which were expected to be large customers during the year. The Russian season was now opening, and heavy shipments were looked forward to. The exports during the past month had reached 8456 tons, of which more than one-half went to the United States. The home enquiry was rather quiet, the purchases by the railway companies not having reached the quantity expected. In April business continued without any material change. Large shipments were still made to the United States and Russia. Quotations for railway iron were well maintained, and strong hopes were entertained that as the year advanced prices would gradually move upwards. There was a fair continental enquiry for bars, and a better demand for plates was looked forward to, consequent upon the improvement in the iron shipbuilding trade. The result of the Quarterly Meetings imparted increased confidence in the trade, makers being of opinion that better prices would shortly prevail. American advices were encouraging, and several Russian contracts were in course of execution. The exports during March reached 32,409 tons, the largest quantity cleared in one month for a long time past. Shipments continued on a tolerably large scale to both the American and Russian markets, and stocks were so reduced in consequence that the slightest improvement in the demand would be immediately felt at the works. In May there was considerable degree of vitality evinced in the trade, and the principal works were fairly employed. Rails were still chiefly enquired for on American and Russian account, and it was expected that before the close of the season a large increase on previous years would be shown in the clearances to Russia. Buyers of railway iron at home were now beginning to enter into engagements with more freedom, and if makers had not insisted on full list quotations they would have received considerable contracts. There was no disposition, however, to accept heavy orders, as higher prices were looked forward to. Excepting in the rail department, however, there was not much vitality evinced, but in this there was the usual degree of activity. Russian requirements were large, and from the United States there was still a good enquiry. Last month the exports reached 21,329 tons, of which New York took 7253 tons. Several vessels were wanted for the American and Russian markets, and it was not improbable that freights would shortly advance, as it was difficult to obtain suitable tonnage, and there was an unusually large quantity waiting shipment. Home purchases for rails also slowly increasing. In June the works were still employed with the same degree of regularity which had characterised them for two or three months. American transactions received a slight check, owing to recent events in the United States, but it was not expected to prove more than temporary, and the shipments were not in any way interfered with. Several additional engagements were in the market for both Russia and America, but makers were indisposed to accept contracts for future delivery except at an advance in prices. Home requirements, however, kept below expectations, although there was some improvement. Buyers did not, as formerly, make purchases in anticipation, but were content to have little or no stocks, and this kept prices lower than they would otherwise have been. The exports during the previous month reached 20,802 tons, of which New York took 5927 tons, and Constantinople 2042 tons. Several new contracts for rails were now on offer in the market, but makers were not anxious to secure further orders until the future position of the trade was more clearly ascertained. Home requirements were below expectations, although they were in excess of what they had been three months previously. In July the confirmation of old list prices at the Quarterly Meeting was generally anticipated. The exports to the Russian and American markets continued large. Continental enquiries remained about the same, but as the Belgium and French houses were reported to be full of engagements additional contracts were looked forward to on continental account. The home demand was expected to improve as the new quarter advanced, as stocks were everywhere low, and the cheapness of money was likely to lead to more extensive purchases being made. In the rail department prospects were considered favourable, and the contracts already received were expected to keep the works going for some months. Prices were firmer, and when that delivery was required makers would not book engagements except at advanced rates. Despite the activity evinced in the shipments to the Russian markets, it was doubtful whether the whole of the orders would be completed and cleared before the close of the season. American engagements came in pretty freely. The exports during the previous month reached 16,966 tons, of which the Russian markets took 7700 tons, and the United States nearly 5000 tons. Throughout the month the trade continued in a satisfactory condition. In August the Russian orders were being shipped as fast as possible, but it was still doubtful whether the whole of the contracts would be cleared before the close of the navigation. The fresh American engagements offered were not quite so numerous, the falling off being attributable to a variety of causes. The home trade did not evince that degree of vitality which was expected, the contracts offered showing but a slight increase in the demand. Foreign engagements for railway iron continued to be freely offered, but makers were not disposed to take additional orders except at an advance in prices, and deliveries to commence after the close of the Russian navigation season. The exports to the United States and Russia were still large. There was little demand for bars, and as prices were unremunerative makers devoted nearly the whole of their attention to rails, for which better prices were obtained. Towards the latter part of the month the excessive heat caused some reduction in the make, and as water was scarce materially interfered with operations at the works. In September the change in the temperature enabled the works to be kept going with more regularity, and stocks in the hands of consumers were reported to be low. The foreign trade continued buoyant, the principal establishments being actively employed on orders which required to be completed within the next six weeks. Fresh contracts for considerable quantities of railway iron were in the market, but makers declined to accept more engagements except for forward delivery, and at advanced prices. The exports during the last month reached 20,099 tons. There were still contracts on the books for some thousands of tons for both Russia and the United States. In October the decision of the Preliminary Meeting of Ironmasters to adhere to old list quotations was fully anticipated. It was now expected that very shortly the Russian shipping season would be closed, and that consequently contracts to a considerable amount would have to remain over until next spring for delivery. The exports to Russia since April had been larger than ever before known, and there was a prospect of next year's demand being equally as great. American enquiries continued tolerably numerous. Last month the exports reached 8298 tons, the bulk of which was for the American and Russian markets. Home business made but slow progress, although there was some improvement, the rail branch being the only one that

evinced any vitality. Continental engagements were slowly increasing. Towards the close of the month great anxiety was shown to complete some of the Russian contracts, and high rates of freight were offered. In November it was not expected that the advance granted to the puddlers in Staffordshire would cause any difficulty in Wales, as the men were paid upon a different scale, but after the general advance had been decided upon in Staffordshire it was thought likely that the workmen in Wales would demand an advance also. There was no want of employment at the rail mills, and makers paid but little attention to the other branches of the trade, in consequence of the more remunerative prices obtained for rails. American shipments of rails continued on a tolerably large scale, and a large Russian trade was looked forward to next spring. In consequence of the advance in Staffordshire a further improvement was manifested in the trade, and a decidedly favourable effect was produced. Home buyers for rails evinced much greater readiness to enter into transactions than for a long time past, being of opinion that higher prices would shortly be paid. The late advance in Staffordshire had but little influence upon prices in Wales, in consequence of the bar-iron trade being so remarkably quiet. The rail mills still kept in regular employ. A change now occurred in the American demand, buyers being afraid that the tariff would be made more stringent. The continental demand was good, engagements being offered on account of the Spanish and Italian markets. In December the trade continued well employed on rail contracts, and several cargoes had been cleared for Italian ports. American advices still expressed fears as to the increase in the tariff for iron. Home business was rather better, but had shown no improvement. A considerable increase took place in the demand for rails, and better prices were realised. American engagements were vigorously pushed forward, and from the continental markets there was a good enquiry, while business on Indian account showed signs of gradual revival. The exports for the last month reached 9040 tons, of which New York took 1202 tons, New Orleans 2100 tons, and Genoa 1497 tons. A good business was looked forward to early in the new year.

In Swedish iron there was not much doing at the commencement of the year, but towards the close of January the enquiries became more active, and a large amount of business was done; and a further improvement was looked forward to as soon as the navigation became open. In February the enquiry still continued good, with prospects of future good business. The stock now was small. At the close of the month an active demand still existed, and a considerable amount of business done. The same state of things continued during the next month, until the latter part of it, when the market became rather more quiet. In April, also, the demand was not quite so active, and this condition of the market remained throughout the month. In May the market was at the commencement quiet, but afterwards a better business was done, and several large orders were executed. In June a good demand continued to exist, and business to some extent was done. This same state of things continued during the following month, and large sales were effected, and prices were very firm. Towards the close of the month, however, although the demand still continued active, good specifications were more difficult to be obtained. In August and September the demand was quiet, and there was not so much doing. In October Indian assortments became scarce, and higher prices were looked forward to. As the month advanced a much better enquiry began to exist, and prices became firmer. The stock now became very limited, and there was not much apparently coming forward. A good business, upon the whole, was done during the month. In November the demand became less active; there were still, however, numerous enquiries, but actual business did not transpire to any extent. The stock now was very small, and supplies came forward very slowly. In December the market remained without change, but ere long prices began rather to give way, and throughout the month there was not much enquiry.

In Scotch Pig-Iron at the commencement of the year the demand was not very active, the price being 55s. cash. Soon, however, it rose to 55s. 4d. cash and 55s. 5d. cash; but as the market did not become very active, and the transactions were only moderate, it declined to 55s. 1d. cash before the close of the month. In February the market opened dull, with the price the same as at the close of the previous month; it soon, however, improved, and a good business was done at prices up to 55s. 7d. cash. Afterwards, however, the market weakened, and business was done as low as 54s. 11d. cash; and as the market still continued dull, the price further declined to 54s. 5d. cash. In March dullness still characterised the market, and the price went down to 53s. 8d. cash, and afterwards to 53s. 3d. cash; no improvement occurring it went down to 52s. 9d. cash. Towards the close of the month a fair business was done in warrants, and there was also a considerable increase in the shipments, but still the price remained at 52s. 9d. cash. In April a better tone pervaded the market, and a large business was done in warrants, at prices varying up to 53s. 4d. cash. The market, however, afterwards became quiet, and prices declined to 52s. 9d. cash and 53s. one month. The market now became irregular, and although a fair business was done, the price declined to 52s. 3d. cash. Towards the close of the month an extensive business was done in warrants at 52s. 6d. cash and 52s. 9d. one month. In May the market was inactive, and the price declined to 52s. 1d. cash; and as at this time the money market was unfavourable, and had the effect of checking business, the price receded to 50s. 7d. cash, but before the close of the month improved to 50s. 9d. cash, at which a fair business was done. In June business rather improved, and prices went up to 51s. 1d. cash and 51s. 4d. one month, but soon dropped to 50s. 9d. cash and 51s. one month, and afterwards to 50s. 7d. cash, and towards the close of the month to 50s. 6d. cash and 50s. 9d. one month, but before long advanced to 50s. 8d. cash, and afterwards to 50s. 10d. cash, at all of which prices a fair amount of business was done. Towards the close of the month a better feeling arose, and prices went up to 51s. 7d. cash and 51s. 10d. one month. In August the market still continued to improve, and prices advanced to 51s. 9d. cash and 52s. one month. An extensive business was then done, and prices steadily improved to 52s. 3d. cash and 52s. 6d. one month. These prices continued with but little fluctuation up to the end of the month, a very good business having been done. In September the market still further improved, and business was done up to 53s. 4d. cash and 53s. 7d. one month; and as a large business continued to be done prices still further advanced, to 53s. 6d. cash and 53s. 8d. one month; but, in consequence of adverse operations in Paris and New York, prices receded to 52s. 9d. cash and 53s. one month. However, a steady improvement took place ere long, and prices went up to 53s. 4d. cash and 53s. 7d. one month. In October a good deal of fluctuation took place at the commencement of the month, but prices eventually declined to 52s. 11d. cash and 53s. 1d. one month. A good business, however, set in, and prices advanced to 53s. cash and 53s. 3d. one month, and afterwards to 53s. 3d. cash and 53s. 6d. one month. Towards the close of the month the market became quiet, but prices still remained the same. In November an improved business was done, and prices went up to 53s. 4d. cash and 53s. 7d. one month. Considerable activity now occurred in the market, and prices advanced to 54s. 7d. cash and 54s. 10d. one month, but afterwards declined to 54s. 4d. cash and 54s. 6d. one month. Towards the close of the month the market began to improve, and prices went up to 55s. cash and 55s. 1d. one month. In December an extensive business was done, and prices advanced to 56s. 1d. cash and 56s. 4d. one month. This improvement still continued, and prices went up to 56s. 6d. cash and 56s. 9d. one month, and afterwards to 57s. 3d. cash and 57s. 6d. one month, with a very active market.

LEAD.—In January a fair business was done, the market was steady, and prices firm; but as the month advanced the market became less active, still no change occurred in quotations. In February the market was without activity at the commencement of the month, but as it advanced an improvement took place, and an advance of 2s. 6d. per ton was established. A better enquiry now began to exist, and prices still showed an upward tendency. In March the demand was still good, and sellers were very firm in their prices. This condition of the market remained throughout the month, a very good business having been done. In April business was still active, and sellers were very firm in their prices, good soft English being now quoted at 19l. 10s., L.B. at 19l. 15s., and W.B. at 20l. 15s. The market

continued steady throughout the month at the foregoing prices. In June, however, the demand was not so good, business being only limited, and prices became a trifle easier. This state of things continued throughout the month. In June the market continued without activity, no improvement in the demand having taken place, and prices remained easier. In July a good business was done in pig, and the trade became more active; prices also began to improve, and a better firmness was manifested. In August a steady business was done, the demand being a very good average one, and prices were steady. A similar state of the market continued throughout the following month, business being, upon the whole, very fair, and prices steady. In October a fair shipping trade was still done, and special orders for China were in moderate request; prices, however, upon the whole, were rather easier. Towards the close of the month, however, the business rather fell off, and prices consequently did not improve. In November there was rather an improvement in the demand, and a steady business was done, prices becoming again tolerably firm. In December a moderate business only was done, and prices remained without alteration.

TIN.—On Jan. 8 an advance of 2s. per ton was announced by the smelters of English, making prices 112s. for blocks, 113s. for bars, and 114s. for refined. The market for foreign also improved about 2s., and considerable business was done in Straits at 109s. to 110s. 10s. cash, and Banca at 110s. cash. In Holland the stock of Banca on warrants on Dec. 31 was 96,073 slabs, against 151,109 slabs same time last year, and the arrivals towards next sale were 45,941 slabs, against 35,568 slabs same time last year. The stock of foreign in London on Dec. 31 was 1665 tons, against 2256 tons the previous year. The market for Straits continued to improve, and business was done at 112s. to 113s. cash, and 114s. for arrival. On Jan. 18 the smelters of English announced another advance of 4s. per ton, making prices 116s. for blocks, 117s. for bars, and 120s. for refined; this caused an advance in Straits, which went up to 116s. cash. Towards the end of the month, however, the market was not so well sustained, and business was done in Straits at 114s. cash and 114s. 10s. for arrival. English, however, remained steady at the official rates. In February the market remained much in the same position. In Holland the stock of Banca on warrants on Jan. 31 was 78,873 slabs, against 144,459 slabs same time last year; and the arrivals towards next sale were 52,661 slabs, against 43,779 slabs same time last year. The quotation in Holland at that time was 67s. 6d. Towards the close of the month a better feeling occurred in the market, and prices became firmer, and on Feb. 26 the smelters of English announced a further advance of 4s. per ton, making prices 120s. for blocks, 121s. for bars, and 124s. for refined. The market for foreign now became very animated, and prices continued to advance, Straits going up to 115s. 10s. cash, and then gradually advancing to 120s. cash; and to arrive business was done at 118s. up to 121s. cash. Banca also was sold at 117s. up to 119s. On March 1 the smelters of English announced another advance of 5s. on blocks and bars, and 6s. on refined, making prices 125s. for blocks, 126s. for bars, and 130s. for refined. The market for foreign also continued its upward movement, and considerable business was done at prices varying from 125s. to 127s. cash, Banca being quoted at 130s. In Holland the stock of Banca on warrants on Feb. 28 was 67,472 slabs, against 133,459 slabs same time last year; and the arrivals towards next sale were 60,326 slabs, against 51,106 slabs same time last year. On March 17, however, the smelters of English announced another advance, of 2s. in blocks and bars, and 3s. in refined, thereby making the prices to be 127s. for blocks, 128s. for bars, and 133s. for refined. Straits also improved in price, and business was done at 130s. cash. Banca also was sold at 131s. and afterwards at 132s. On April 1 the Dutch Trading Company's sale of Banca took place at Amsterdam, when the whole quantity of 49,500 slabs was sold at 82s. 6d., equal to 142s. 14s. here. A reduction of 30 per cent. had to be made in the purchases, the orders exceeding the quantity for sale. Before the sale Straits had been sold at 132s. cash, but subsequently the price rapidly rose, and considerable business was done up to 138s. cash. In Holland the stock of Banca on warrants on March 31 was 60,372 slabs, against 174,458 slabs same time last year; and the arrivals towards next sale were 70,507 slabs, against 11,826 slabs same time last year. On April 5 the smelters of English announced another advance, of 6s. per ton, making prices 133s. for blocks, 134s. for bars, and 139s. for refined. In Straits business was done at 137s. cash, but afterwards declined to 135s. On April 12, however, the smelters of English, finding that the price had been put up too high, announced a reduction of 3s. per ton, making prices 130s. for blocks, 131s. for bars, and 136s. for refined. Straits now began to drop from the position it had occupied, and sales were effected at 130s. cash, but afterwards improved to 131s. cash, and then went up to 133s. to 134s. cash; but afterwards gave way to 132s. cash. English now began to be sold under smelters' prices. In May the market for Straits began again to improve, and business was done at 133s. cash and Banca at 135s. In Holland the stock of Banca on warrants on April 30 was 104,469 slabs, against 119,211 slabs same time last year; and the arrivals towards next sale were 28,790 slabs, against 59,760 slabs same time last year. English was now obtainable at about 3s. under official quotations. Straits was now sold at 133s. cash. On May 17 the smelters of English announced another decline of 3s. per ton, making prices 127s. for blocks, 128s. for bars, and 133s. for refined, but as sales had been previously made at or under these prices little or no actual alteration was made in the market. Transactions in Straits occurred at 132s. cash, and Banca at 134s. cash. Towards the close of the month, however, the market for Straits improved, business was done at 134s. cash, and afterwards at 136s. cash. In June the market for Straits was firm at 136s. cash, and English was rather firmer. In Holland the stock of Banca on warrants on May 31 was 101,069 slabs, against 106,472 slabs same time last year, and the arrivals towards next sale were 33,994 slabs, against 62,921 slabs same time last year. As the month advanced the market generally became less active, Straits being quoted at 133s. cash, and English being obtainable under smelters' quotations. Towards the close of the month, however, the market dropped, and business was done in Straits at 128s. cash, and on June 26 the smelters of English announced a reduction of 4s. per ton, making prices 123s. for blocks, 124s. for bars, and 131s. for refined; as, however, sales had been previously made at about these prices, little alteration was really made in the market. Straits, however, rather improved in value, and business to a limited extent was done at 130s. cash. In July the market for Straits continued to improve, and transactions occurred at 131s. cash. In Holland the stock of Banca on warrants on June 30 was 96,569 slabs, against 95,872 slabs same time last year, and the arrivals towards next sale were 37,167 slabs, against 66,966 slabs same time last year. The market now became very quiet, Straits remaining at 130s. cash. Towards the close of the month, however, a little more activity prevailed, and sales of Straits were effected at prices varying from 130s. cash up to 132s. cash. In August the market for English was steady at official quotations, Straits continuing at 132s. cash. In Holland the stock of Banca on warrants on July 31 was 89,247 slabs, against 88,772 slabs same time last year, and the arrivals towards next sale were 40,302 slabs, against 78,303 slabs same time last year. The market remained without any animation, and about the middle of the month Straits declined to 130s. cash, English being steady at smelters' prices. In September a decided improvement was manifested in the market for both English and foreign. Straits advanced to 133s. cash, a considerable business being done; Banca was sold at 135s. In Holland the stock of Banca on Aug. 31 was 89,347 slabs, against 78,062 slabs same time last year, and the arrivals towards next sale were 40,789 slabs, against 92,495 slabs same time last year. On September 6 the smelters of English announced an advance of 3s. per ton, making prices 126s. for blocks, 127s. for bars, and 134s. for refined. The large quantity of Banca announced for sale in Holland had the effect of checking operations in Straits, and the price went down to 132s. cash. Little business continued to be done throughout the month. On Oct. 1 the autumn sale of Banca by the Dutch Trading Company took place, when 61,633 slabs of Banca and Billiton were brought forward, which were sold at 74s. 6d., being much below the price generally anticipated; the consequence of which was prejudicial to the value of Straits, the price of which was dropped to 128s., Banca being sold at 128s. 10s. to 129s. As the market continued without any animation prices still dropped, and business in Straits was done at 127s.

cash, and afterwards at 126s. cash; and on Oct. 16 the smelters of English announced a fall of 3s. per ton in blocks and bars, and 4s. per ton in refined, making prices 123s. for blocks, 124s. for bars, and 130s. for refined. In Straits but few transactions occurred, and those at 125s. cash. The market continued very inanimate throughout the month. In November the market continued inactive, and Straits to a limited extent was sold at 123s. cash. In Holland the stock of Banca on warrants on Oct. 31 was 110,617 slabs, against 140,759 slabs the same time last year, and the arrivals towards the next sale were 28,716 slabs, against 44,010 slabs the same time last year. The market now became in a very unsettled state. Transactions in English occurred under smelters' prices. There were buyers of Straits at 115s. to 116s. cash, and sellers at 119s. to 120s. cash, but no actual business occurred. Business was done in Banca, in Holland, at 67s. 6d. About the middle of the month the market became unsettled, in consequence of the report that a house that was supposed to hold large quantities of tin was in difficulties, and transactions to a limited extent occurred in Straits at 118s. cash, and Banca at 117s. 10s. to 118s.; and English was obtainable, common at 4s. and refined at 6s. under smelters' quotations. It was afterwards announced that arrangements had been made by which all the tin held by the house referred to, amounting, it was said, to about 1600 tons, would be taken up by parties who had advanced upon it, at the rate of 114s. per ton; this caused a rather better feeling in the market, as it was considered that this arrangement was very satisfactory, and there appeared a probability that the market would become strengthened. On the 29th the smelters of English announced a fall of 3s. per ton on blocks and bars, and 6s. on refined, making prices 120s. for blocks, 121s. for bars, and 124s. for refined. Business had, however, previously been done at these reduced prices. In December the market for foreign became steadier, and business was done in Straits at 116s. cash, and Banca at 115s. 10s. In Holland, the stock of Banca on warrants on Nov. 30 was 86,034 slabs, against 126,259 slabs same time last year; and the arrivals towards next sale were 32,795 slabs, against 44,109 slabs same time last year. The market for Straits now began to droop, and prices declined to 110s. to 112s. cash; on the 13th inst. the smelters of English announced a reduction of 3s. per ton in blocks and bars, and 6s. per ton in refined, making prices 117s. for blocks, 118s. for bars, and 118s. for refined. The market for foreign remained in a very unsettled state, and business to a limited extent only done. Small parcels of Straits and Banca both sold at 111s. cash.

SPELTER.—At the commencement of the year the market was rather inanimate, with few transactions of importance, the price for parcels on the spot being 20s. 5s. to 20s. 10s. The stock in London at the end of the previous year was 1659 tons. Towards the close of the month, however, a better feeling occurred, and a considerable amount of business was done, amounting in all to about 1300 tons, at 20s. 10s. for parcels on the spot, and at 20s. 10s. to 21s. for forward delivery. In February the improved condition of the market continued, and a good amount of business was done at improving prices, up to 21s. 5s. for parcels on the spot, and at 21s. 10s. for arrival. The stock in London on Jan. 31 was 1540 tons. The market still continued to improve, and the price on the spot advanced to 21s. 7s. 6d.; and as the demand continued good, and a large business was done, it went up to 21s. 10s., and then to 22s. In March a good demand still existed, and the price became very firm, at 22s. for parcels on the spot. The stock in hand on Feb. 28 was 1106 tons. Towards the close of the month, however, the market became less active, and the price of parcels on the spot dropped to 21s. 5s., 21s. 10s. In April the market became inactive, and the price for parcels on the spot further declined to 20s. 15s., 21s. per ton. The stock in London on March 31 was 1337 tons. No improvement occurring, the price for parcels on the spot further declined to 20s. 7s. 6d., 20s. 10s., but afterwards improved a trifle to 20s. 10s., 20s. 12s. 6d., very little business, however, being done. In May there was still no better feeling in the market, and only a limited amount of business was done. The price for parcels on the spot now dropped to 20s., 20s. 5s. The stock in London on April 30 was 1482 tons, still no improvement occurred, and the price dropped 2s. 6d. per ton. But towards the close of the month a more active demand sprung up, and the price became again firm at 20s. to 20s. 5s. for spot parcels. In June the market again became inactive, and but little business occurred; the quotation for parcels on the spot, however, remained at 20s. 5s. The stock in London on May 31 was 1310 tons. The demand now began considerably to improve, and a good business was done at advancing prices, and the market eventually became firm at 21s. for parcels on the spot; as the month drew to a close, however, this activity passed away, and very few transactions occurred, the quotation for parcels on the spot still remain at 21s. In July, no improvement arising, the price for spot parcels went down to 20s. 10s., 20s. 15s. The stock in London on June 30 was 1281 tons; during the month, however, the quotation rose to 20s. 17s. 6d., 21s. Transactions were still very limited. Before the close of the month, however, as the market remained dull, the price fell to 20s. 15s., very little business being done. In August the same condition of the market continued, and the price remained without alteration. The stock in London on July 31 was 1128 tons. The month passed away without any change for the better taking place, or any change in the price for parcels on the spot. In September no activity occurred, and little or no business was done, the price remaining unaltered. The stock in London on August 31 was 1227 tons; as this state of things continued the price dropped to 20s. 10s., but very little business occurred, and this state of things remained throughout the month. In October no improvement took place, and holders became willing to make concessions in order to secure business, but very few transactions occurred; the price fell to 20s. 5s., 20s. 7s. 6d. for parcels on the spot. The stock in London on Sept. 30 was 1481 tons, still no improvement arose, and the price for parcels on the spot eventually went down to 20s., and afterwards to 19s. 15s., and then to 19s. 10s., but still business could not be secured, the market remaining exceedingly dull and lifeless. In November the same unsatisfactory state of the market continued, and little or no business was done, the price for parcels on the spot remaining nominally at 19s. 10s. The stock in London on Oct. 31 was 1163 tons; a little improvement afterwards occurred, and parcels on the spot were quoted at 19s. 15s. In December the market continued quiet, and parcels on the spot were quoted at 19s. 10s. to 19s. 15s. The stock in London on Nov. 30 was 1246 tons; no improvement occurred throughout the month, and the price for parcels on the spot remained without change.

TIN-PLATES.—In January the works were in pretty regular employ, and prices, especially for coke, were firm. The advance which occurred about this time in the price of tin necessitated an advance in prices, and spring prospects were considered good. In February the demand continued good, and makers were firm in their prices. Towards the close of the month the continued advances in the price of tin caused makers to be exceedingly firm in their prices, and an advance became not improbable. In March a good business was still done, and prices were fully maintained, and towards the close of the month additional firmness was shown in the market, and many of the makers began to ask higher prices. In April makers were well supplied with orders at the advanced prices, and it was fully expected that the enhanced value of tin would cause a further advance before long. At the Quarterly Meeting of Tin-Plate Makers an advance of 2s. per box was determined upon, and it was thought that, unless the make became exhausted, higher prices would still occur. Throughout the month the works continued in regular employ, and prospects continued very good. In May makers were still fairly placed for orders, coke qualities especially being in very good demand at current quotations, and it was considered that if the competition was not increased by the establishment of more new works the market would be enabled to retain its firmness. Orders from the American and Canadian markets now began to flow in freely, and very considerable business was done. In June makers were still well supplied with orders, and coke especially were in good request. Towards the close of the month, however, there was a slight falling off in the purchase of coke qualities, and quotations were not quite so firm. In July, at the Quarterly Meetings of the trade, representations as to the position of the trade were rather unsatisfactory, the relative price of tin-plates, as compared with that of the raw article, being lower than hardly ever known before; and though the export was consider-

ably increased, many of the works were not more than half employed, which indicated that the multiplication of new works had been far too rapid in proportion to the increase in the demand. It was, therefore, resolved that as the ruling prices are still unremunerative, the meeting recommends that the reduction of make shall continue until such time as prices improve. There now occurred rather a falling off in the demand in proportion to the make, and at many of the works short time prevailed, and manufacturers now began to reduce their make, in conformity with the resolution of the Quarterly Meeting. The trade now became in an unsatisfactory condition, and one or two failures which occurred in the trade had the effect of shaking confidence. In August the restriction of the make exercised a favourable effect, and the market became steadier; and as soon as a better feeling was manifested prices became firmer, and towards the close of the month there was a better demand for coke qualities, especially for the United States. In September the market became again inactive, and consequently prices were less firm, but before long makers reported an improved enquiry, consequent upon the large falling off in the deliveries to the warehouses in Liverpool, and quotations consequently showed an upward tendency. The trade now gradually attained a more healthy position, although prices were still far from remunerative. Stocks were now so materially reduced that higher quotations were expected. In October, however, there was not much activity in the trade, and makers complained of the unremunerative character of prices, but the large reduction in the make was expected to exercise a favourable influence upon the market; unfortunately, however, this did not occur, and in November dulness characterised the trade, the purchases made by American houses being comparatively small, operations began to be reduced at the works. In December the trade remained quiet, with a very inactive demand, and no improvement was now looked for before the next quarterly meeting.

STEEL.—At some periods of the year a very good business has been done in foreign, and large transactions have taken place, but upon the whole, the demand has been by no means equal to what it has been in former years. The stock here has been generally small, and at times there has been none here at all, and consequently all orders had to be sent over to Sweden for execution.

QUICKSILVER.—Until the latter part of the year the demand has been very moderate, and sales have been only limited; but then a much better demand sprung up, and several large purchases have been made, principally for shipment to China. The price has remained unaltered, except for one day, throughout the year, when it was shown at 2s. per bottle less.

THE SCOTCH IRON TRADE.

The course of the Iron Trade during this year shows, as was foreshadowed in my last annual report, a gradual return to another period of prosperity. Although the fluctuations exhibit a wider range of prices—varying from 50s. 6d., the lowest price touched in June, to 58s. 6d., the highest figure reached this month—yet the average price for the year is only 53s. 3d. per ton, being about 5s. per ton below the average of the last quarter of a century. The demand is not only good for "warrants," but it is increasing for "special brands" of No. 1, for foreign export, at considerably better prices in proportion.

The production this year, according to the returns, is 1,150,000 tons, against 1,068,000 tons in 1868; and the home consumption and exports amount to 1,098,000 tons, being 125,000 tons more than those of last year, thus—

	1869.	1868.	Increase.
Production in 1869, per makers' returns .. Tons	1,124,000	1,042,000	82,000
Carroll make, computed at	26,000	26,000	—
Stock on hand, Dec. 31, 1868	568,000	—	—
Total	1,718,000	—	—
Shipments—Foreign Tons	388,629	324,018	64,629
—Coastwise	240,450	238,922	1,528
Forwarded per railway	21,911	22,260	—
Consumed in local foundries	240,000	208,000	32,000
Consumed in malleable iron works	207,000	179,900	27,000

Stock in warehouse-keepers' & makers' stores, } 620,000
Dec. 31, 1869 (including Carroll) } Decrease, 340 tons.

The furnaces at the pig-iron works in Scotland on Dec. 25 were—

Proprietors.	Works.	In blast.	Out.	Total.
Wm. Baird and Co.	Gartsherrie	14	2	16
ditto	Eglinton	7	1	8
ditto	Blair	3	2	5
ditto	Lugar	4	—	4
ditto	Muirkirk	3	—	3
ditto	Portland	3	3	6
Merry and Cunningham ..	Glenarnock	6	4	10
ditto	Ardeer	4	—	4
ditto	Carabrook	6	—	6
Coltness Iron Company	Coltness	12	—	12
Dalmellington Iron Company ..	Dalmellington	8	—	8
Monkland Iron and Steel Co. ..	Monkland	8	1	9
Robert Addie	Langloan	7	1	8
Wilson and Co.	Summerlee	7	1	8
John Wilson's Trustees	Dundyvan	—	—	—
James Dunlop and Co.	Clyde	4	2	6
Colin Dunlop and Co.	Quarrier	3	1	4
William Dixon	Govan	3	2	5
ditto	Calder	6	2	8
Robert Stewart's Trustees	Omca	—	—	—
Shotts Iron Company	Shotts	4	—	4
ditto	Castlhill	2	1	3
Wishaw Iron Company	Wishaw	3	—	3
George Wilson and Co.	Kinnell	3	1	4
Lochgelly Iron Company	Lochgelly	2	2	4
A. Christie and Co.	Lumphinnans	1	1	2
Carroll and Co.	Carroll	3	1	4
James Russell and Son	Almond	2	1	3
C. and A. Christie	Glasgmir	1	—	1
Total		129	29	158

The stock of pig-iron in Scotland at present date shows an increase of only 52,000 tons when compared with the year 1868, being now 620,000 tons, thus—

	Dec. 25, 1869.	Dec. 25, 1868.
Messrs. Connal's stores Tons	316,682	269,261
Forth and Clyde Canal Company's stores	16,830	16,265
In makers' hands, as per their return	186,488	182,474
Total	520,000	468,000
The Carroll Company declining to furnish returns, their stock is estimated at	100,000	100,000
(And their make at 26,000 tons for the year.)	—	—
Total	620,000	568,000

Whilst the increasing demand for rails and all kinds of malleable iron, at the advance in price of 10s. to 15s. per ton, gives every promise of continuing, the iron founders are experiencing a notable improvement, and the Clyde shipbuilders a more active demand for iron ships, especially for steamers adapted to the Suez Canal. The prospects of the coming year are, therefore, decidedly favourable; and, with the advantages of unclouded peace, cheap money and grain, which we at present enjoy, combined with the gradual improvement taking place in the general industry of the country, it should prove one in every respect auspicious to the iron trade.

St. Vincent-street, Glasgow, Dec. 25. THOMAS THORBURN.

MANUFACTURE OF PEAT.—Mr. A. EDMANN, C.E., of Palmerston-buildings, in converting the peat into charcoal or fuel, the peat, when dug or raised, is placed in a vertical cylinder of suitable size, in which a shaft armed with knives or blades rotates, the cylinder being also provided with similar knives or blades placed laterally, and in passing between or through which the fibre of the peat is thoroughly broken. The bottom of the cylinder is a spiral incline of from 5° to 10° of pitch, having at the lowest point a porthole or opening through which, in a state of semipulp, the peat passes on to a pair of corrugated or toothed rollers on the top of the machine.

STEAM-ENGINES.—The value of the steam-engines exported from the United Kingdom in the ten months ending Oct. 31 last year was computed at 1,429,499s., as compared with 1,470,171s. in the corresponding period of 1868, and 1,717,270s. in the corresponding period of 1867. The value of the steam-engines exported to Russia was largely increased last year, having risen to 294,284s., as compared with 149,618s. in the corresponding period of 1868, and 65,189s. in the corresponding period of 1867. While the demand for English steam-engines (in which expression, we presume, we may include "locomotives") largely increased last year in Russia, it has de-

clined in India in consequence of the slackening which has taken place in the work of Indian railway construction. Thus in the ten months ending Oct. 31 we only sent India steam-engines to the value of 241,496*l.*, as compared with 472,601*l.* in the corresponding period of 1868, and 811,961*l.* in the corresponding period of 1867. There was rather an improved demand last year for English steam-engines in Egypt and Australia, but a falling off occurred as regards France, Spain, and Brazil.

The Royal School of Mines, Jermyn Street.

MR. WARINGTON SMYTH'S LECTURES.

[FROM NOTES BY OUR OWN REPORTER.]

LECTURE XIV.—I described (said Mr. SMYTH) in yesterday's lecture the principal circumstances under which the operation of boring becomes essential in the exploration of the ground in the works of the mine; and more especially when large bodies of subterranean water are to be reached; and I mentioned a few of the leading facts connected with the arrangements made for that purpose. When the holes are of no great depth, and present no unusual difficulties, the rods are lifted by means of cross-heads and by manual labour, and then let go, so as to give the stroke at the bottom. As the depth becomes greater this simple mode becomes impracticable, and a spring pole is employed, or in some districts a windlass. In the latter case there is a toothed-wheel attached to a portion of the barrel, and fitting into cog fastened to the rod. By this means the rod is wound up a certain number of inches, and then let fall by its own weight. In this plan there is great wear and tear of the cog, and it is not, therefore, very frequently employed. The windlass is used very much as it is often seen on shipboard. The windlass is placed over the bore-hole, and the boring-tool being attached to a rope, two or three turns of the latter are put round the barrel, and adjusted to a proper length of fall. One man is placed at the windlass, and another holds the slack. The former turns until the tool at the bottom is raised to a proper height, when the latter lets go, and the tool falls, and gives the blow at the bottom of the bore-hole. As the depth becomes greater two men will be put on the windlass, and, as a rule, several blows a minute can be given in this way. There is, however, great wear and tear of the rope, and the plan is not nearly so suitable as the spring-pole for deep borings, when a lever of the first order is employed. When, however, we come to the large diameters I have mentioned, it becomes necessary to employ the steam-engine. Bore-holes of no great depth or diameter may be worked with or without a frame overhead; but as the hole increases in depth the erection of shears, or boring towers as they are called, becomes necessary. When bore-holes are numerous, these shears are of very singular appearance from a distance, as they are often like old districts of America. [The lecturer here exhibited a large photographic view of "Old Creek," where so many wells were sunk for petroleum that, as he said, the boring towers looked like clusters of skeleton church towers.] They are ingeniously and strongly constructed, and show a great deal of that adaptative skill for which the Americans are remarkable. [Mr. Smyth then, by means of drawings and models, showed the methods by which lightness and economy of material were combined with great strength in these erections.] One of the most important connections with bore-holes which present no great difficulty may be noted. You will recollect that the ground is cut away at the bottom by blows from generally a chisel-pointed cutter, which is revolved through a small portion of the circle, and managed by men holding the cross-head, and it may be done by the master borer, who gives it a turn every time the tool is lifted, and by this means can detect with remarkable precision every little inequality, and tell at once whether it is necessary to give a second blow at that place. Indeed, it is wonderful how readily a good borer can tell by the sound or feel of the cutting tool conveyed through the rods by vibration, what is going on at the bottom of the hole, even when it has reached great depths. Guided in this way, they change as often as it may be necessary the ordinary cutter for another, to meet a special difficulty. Sometimes, when from accident the bore-hole is thrown out of the perpendicular, a fracture of the rods will occur, and particularly if there should be a flaw in the iron, or if a cheaper quality of iron than is advisable has been tried. Very much depends upon the nature of the fracture and the position in which the broken end is left. In the most ordinary case a small cross-foot is generally used. It is a ring of iron attached to a rod, with a space cut out of the ring, which is of a size sufficiently large to admit the boring-rod below the fracture into the circle. It is then drawn up, and the ring being unable to pass over the joint next above on the rod, it brings up the broken rod with the cutting-tool attached up to the surface. When the hole is not properly lined stones from the sides are apt to fall in, and the broken end of the rod may have fallen into one of these side hollows as to make it difficult to get it clear. By dextrous management the cross-foot may suffice, but when that fails it becomes necessary to try other expedients. The number of contrivances for this purpose are considerable, but still cases do happen in which the broken rod baffles all attempts to extract it, and then nothing remains but to abandon the bore-hole altogether. At the Kentish Town boring, which has already been mentioned, it was found impossible after an accident of this kind to extract the boring-tool, upon which they proceeded with a heavy cast-iron chisel to break up the wrought-iron rods and tool into bits, and then extract those bits by a variety of devices. Often, accident often obliges the borer to put his utmost ingenuity upon the stick, and to make the most of his own resources. When it is important not only to obtain samples of the material bored through, but to get the planes of stratification underground, tubular borers are used. For instance, if we take an area of ground, and put a bore-hole at a given point, we shall obtain information as to the thickness of the different beds, and the depths at which they respectively lie; but we shall learn nothing as to amount of dip or inclination unless we put down three bore-holes. With the aid of tubular borers this information may be obtained from a single hole. The cutters are confined to the side of the cylinder, leaving the centre as a core, and thus when a sufficient length has been worked it is broken off, and on being brought to the surface presents a specimen of the different beds in the position they occupied *in situ*. This is very frequently done on the Continent, and I do not remember a more remarkable instance than one I saw at Creuzot, at a place called Moulin-longe, where a specimen of this kind, several feet in length, was brought up from a depth of 2017 English feet, showing, of course, the stratification exactly as it exists. Some remarkable facts of this kind have been achieved by the French, and they are proud to show them as *tours de force* as examples of what they can do. These cores then show exactly the position in which the beds lie in nature, indicate their dip, and are good samples of the material, besides saving the expense of putting down other bore-holes. When the material in the bottom is broken up to a degree which hinders the stroke of the boring tool, the latter is taken up, and another, called a slodger, let down, by which the debris is lifted to the surface. The boring tool is then lowered again, and the changes have to be made so often that a large proportion of the time of working is occupied by them. As the bore-hole increases in depth the difficulties of boring are multiplied. Not only does the weight of the rods become greater, but the blow is no longer given in the same regular manner, owing to the great flexibility of the rods to which the boring tool is attached. The ordinary weight of the rods is about 22 lbs. to the fathom, so that at a depth of 100 fathoms the weight to be lifted is 2200 lbs., or in other words, about a ton. These pendulous rods are, of course, extremely vibratory, and often strike the sides of the bore-hole, and thus have a tendency to bring down stones and other material besides the same kind of hindering by the friction of their contact the boring-tool from striking at the bottom with the proper force of its weight multiplied by the distance of the fall. In fact, they go down with comparative slowness, and the bottom does not get the full effect of the blows. Boremasters have been trying to overget this difficulty for many years, and have hit upon many ingenious expedients. At first they began by lightening the rods, and for that purpose using the very best iron, made as thin as possible consistently with safety, and the boring tool was heavy and thick as possible, so as to draw the rods out into a straight line. Another device was the employment of hollow rods instead of solid, but, working in water, great difficulty was experienced in making the joints so secure as to keep the interior of the tubes free from leakage. A good deal of boring is done at the salt mines of Westphalia, and at Neu-ulzwerk an attempt was made to get over this difficulty by making the tubing in separate compartments, as it were. Thus each length of rod would be hollow for the most part, but at each end plugs were inserted, and the connection of the rods was effected by solid iron screws. The advantage of this plan was that if one portion of tubing failed, or was injured, the others would not be affected, and thus the tightness of the whole would be but slightly diminished by such an accident; care being taken by the boremaster when they are lifted out for the purpose of clearing the hole to examine each length carefully, to see that no leakage has taken place. Another method of constructing these rods, used with great success in the deeper borings on the Continent, was by making them of wood, with the joints only of iron, the wood, of course, being specifically lighter than the water in the bore-hole, a great degree of lightness was thus obtained. [Mr. Smyth then exhibited specimens of these various modes of construction, and explained the contrivances by which the successive lengths were safely connected together.] The operation of taking the rods out and replacing the boring tool with the slodger, to clear the debris out of the hole, and then replacing the boring tool, again, consumes fully half, and sometimes as much as three quarters, of the time of the men when at work. With a view of lessening this the boremasters of France and Germany, and of late years of England, have increased the length of each rod from 2 ft. to 9 ft. Their best boring is done with rods of this length over the mouth of the bore-hole, they were enabled to take out the rods at once; and there are cases where as much as 60 ft. is pulled out at once, greatly abbreviating the operation of changing the boring tool. When the rods are taken out they are, or ought to be, arranged in regular rows, ready to be screwed on in the same rotation when the work is about to be recommenced. A good deal of attention has been paid to the construction of these shears, and at Chapelle, one of the great bore-holes of Paris, regular boring towers, enclosed in a kind of house, are erected the heights of which are 60 feet. I must mention these French bore-holes again, to give an idea of the advances made by the French engineers, in comparison with the ordinary 3-in., 6-in., 12-in., or 20-in. holes put down formerly for the purpose of Artesian wells. Within the first range of iron tubes at Chapelle for the lining of the bore-hole lying on the ground could stand upright, and the later tubes are 4½ feet English in diameter. The weight of the rods at the depth of from 1500 feet to 1600 feet is 5000 kilogrammes, which, taking the kilogramme roughly at 2½ lbs. English, would be 10,000 lbs. The weight of the cutting tool is nearly 4500 kilos., and thus there is a weight of about 20,000 lbs. to be raised at every stroke. This is so enormous that hand labour is quite out of the question, and in such work as these the danger of action on the sides of the bore-hole are magnified to a very great degree. Various—and, indeed, very numerous—special contrivances have, therefore, been adopted in order to get over this difficulty, some of which are remarkable for their ingenuity and efficiency. Attempts have been made to equilibrate the weight of the rods in the bore-hole by counter-balance weights at the surface; and amongst these one of the best is that of von Eynhausen, a Prussian mining engineer, which is now used at Sangerhausen, where the bore-hole is 12 ft. deep, and 124 in. in diameter. [Mr. Smyth here drew up on the board a diagram showing the different parts and action of the contrivance; the exterior weight when the rods are lifted acting as a help to the engine-power, and when the blow is given, tending to neutralise that vibratory action which is so prejudicial to the bore-hole.] Another mode is that of releasing the boring tool from the rods, and allowing it to give the stroke by its own weight, multiplied by the distance it is made to fall. This at first might seem difficult, but it is now doing the work with great effect, and the rods descend upon it, and, with a nipper-like arrangement, seize it, raise it to the required height, and then let it fall again, and so on with great regularity and considerable speed. This idea was first propounded by M. Fabian, and a Prussian officer of engineers, Lieut. Rost, the latter of whom exhibited models of their contrivance at the French Exhibition. M. Klad, an engineer of great eminence, improved on their plan, but the boring apparatus used at Paris at the present time are those of Laurent, and Degoussé and of Dru and Mulet, both being improvements upon the older contrivances. All these, however, are based upon the same principle. In Rost's plan the tool is enclosed in a cylinder of a length equal to the fall it is desired to have. At the end of the rod, which is made to pass through the cylinder until it reaches the head of the cutter, is a catch, which by a simple contrivance takes hold of a projection on the rods, and is then drawn up. On reaching the top of the cylinder a smart concussion dislodges the tool, which falls free to the bottom of the hole. Mr. Klad's modification of this plan makes the head of the tool to be raised by a pair of nippers, and in actual working it is found to be a most efficient apparatus. Dru and Mulet's plan, which is more like Rost's, the weight being detached by means of a shock, is working with great success at the gigantic bore-hole at Butteux, on the south side of Paris, under the direction of the latter, M. Dru having lately died, but it cannot be recommended except for holes of great width. Laurent and Degoussé's plan is adopted at the other Paris bore-hole, that of Chapelle, and the plan of the latter has been found to be working greatly to the advantage. The success of these colossal borings makes their application to the sinking of shafts a subject for serious consideration; and no doubt if the tubing be steadily carried on at the same time it would prove a great improvement on the old system. [The lecturer exhibited models and drawings of these free-falling apparatus, and explained with great minuteness their several parts.]

GEOLOGICAL SOCIETY OF LONDON.

Professor HUXLEY, LL.D., F.R.S., in the chair.

John Hopkinson, of 8 Larn Road, Haverstock Hill; Samuel John Sanders, M.A., Vice-Master of the Bede, Middle Class Public School; and Jabez Church, C.E., of Great George-street, Westminster, and Chelmsford, Essex, were elected fellows of the Society.

The following communications were read:—

1. "On the Iron ores associated with the Basalts of the North-east of Ireland," by Ralph Tate, Assoc. Linn. Soc., F.G.S., and John S. Holden, M.D., F.G.S.

The authors introduced their account of the iron ores of the Antrim basalt, by stating that since 1791 an iron band had been known in the midst of the basalt of the Giant's Causeway, but that only within the last few years have further discoveries been made, which have developed a new branch of industry in the north-east of Ireland. The iron ore of the numerous exposures was considered to represent portions of one sheet extending uniformly throughout the basalt and over a very large area. It seemed everywhere to be of the same nature, and the authors deduced the following generalised section:—The underlying basalt gradually passes upwards into a variegated lithomarge of about 30 feet thick, graduating insensibly into a red or yellow ochre or bole, of about 5 or 6 feet in thickness, which passes into a dense red ochreous mass of about 2 feet, charged with ferruginous spherulites, consisting chiefly of a protoxide and peroxide. The spherulites are of the average size of peas; they increase in number and size towards the upper part of the band, and not unfrequently constitute the greater part of the lithomarge. The iron band and the overlying and usually more or less columnar basalt is in all cases well defined, and in a few instances exhibits decided unconformability. The authors discussed the several theories that may be suggested to account for the origin of the present condition of the psilolite ore, and proceeded to point out what appear to have been the several stages of metamorphic action by which the psilolite ore had been elaborated out of basalt. From field observations and chemical analyses, they have been led to consider the bole and lithomarge as the resultants of aqueous action in combination with sedimentary action, the former being the result of the deposition of the basalt; and to assume that the bole underlying the iron band was a wet terrestrial surface, and that the subsequent outflow of basalt effected, by its heat, pressure, and evolved gases, a reduction of the contained oxides of iron into the more concentrated form in which they occur in the psilolite, the aggregation of the ferruginous particles being a result of the same actions. The ferruginous series, with interstratified plant-beds at Ballypaddy, was next described, and demonstrated to be of sedimentary origin; the degradation of the psilolite ore, and the degradation of the psilolite ore, of which it is chiefly reconstructed, and of the underlying ochres. Many additions were made to the list of plant remains from these beds; and priority of discovery of plants in the Antrim basalt was accorded to Dr. Bryce, F.G.S.

DISCUSSION.—Mr. D. FORBES was not prepared to admit some of the theoretical conclusions of the authors, and objected to calling in metamorphism to account for all that was hard to be understood. He could not recognise the division of beds so similar in character into two classes. He wished to know, assuming that the iron ore merely resulted from the decomposition of the basalt, what became of all the silica and alumina which constituted three-fourths of the mass? The origin of the psilolite ore was in fact organic. In Sweden certain lakes were regularly edged yearly by the deposition of organic matter, and the psilolite ore, as formed in the same manner as bog iron and similar ores.

Sir CHARLES LYELL had observed in the basalt of Madeira red ochreous bands, which represented old land surfaces, in one of which Mr. Hartog and he had discovered a leaf-bed containing vegetation of much the same character as that of the island at the present day. Near Catania, in a recent lava stream, he had seen the junction of the lava with the soil of the ancient gardens; and in character the soil now under the lava resembled the red beds in Madeira.

Mr. W. SMYTH was, on the whole, inclined to admit the power of metamorphism to produce such changes as had been here effected. He commented on the advantages of employing this Irish ore for admixture with hematite ore, on account of the abundance of alumina present. Possibly there had been some difference in the chemical character of the different flows of basalt.

Mr. EVANS suggested that the Ballypaddy beds might be the littoral deposits of a lake in which the psilolite ore of the other parts of Antrim were deposited further from the shore, and subsequently buried under a basaltic flow.

Mr. ETHERIDGE enquired whether the psilolite ore had been subjected to microscopic examination, with a view of finding traces of organic forms, such as *Gastropoda*.

Mr. TATE, in reply, defended his views as to metamorphic action. He thought the uniformity in thickness and character of the psilolite ore bands over so large an area showed that it could not be a lacustrine deposit. He had not as yet examined the spherulites under the microscope.

2. "Notes on the Structure of *Sigillaria*," by Principal Dawson, F.R.S., F.G.S., Montreal.

3. "Note on some new Animal Remains from the Carboniferous and Devonian of Canada," by Principal Dawson, F.R.S., F.G.S., Montreal.

4. "Note on a Crocodilian Skull from Kimmeridge Bay, Dorset," by J. W. Hulke, F.R.S., F.G.S.

5. "Note on some Teeth associated with two fragments of a Jaw, from Kimmeridge Bay," by J. W. Hulke, F.R.S., F.G.S.

The next meeting of the Society will be held on Wednesday, January 12, the following communications will be read:—

1. "On the superficial Deposits of portions of the Avon and Severn Valleys and adjoining districts," by T. G. B. Lloyd, C.E., F.G.S.

2. "On the Geological Position and Geographical Distribution of the Reptilian or Dolomitic Conglomerate of the Bristol Area," by R. Etheridge, F.G.S.

MANCHESTER LITERARY AND PHILOSOPHICAL SOCIETY.

Mr. J. P. JOULE (President) in the chair.

Mr. W. B. DAWKINS exhibited some old mining tools, brought over by Mr. Baerman from the turquoise mines of the promontory of Sinai, consisting of a stone hammer and rude splinters of flint. The turquoise occur in a bed of a quartzose mottled sandstone in Wady Sidreh and Wady Maghara, in joints running for the most part north and south. They were worked, according to the evidence of the hieroglyphic inscriptions on the rock, by the Egyptians from the third to the thirteenth of the dynasties mentioned by Manetho. In and around the workings there are still the tools with which they were carried on. Innumerable splinters of flint, with their points blunted and rounded by use; stone hammers, some of which are broken; and rounded pebbles with a concavity on either side caused by the friction of the thumb and finger charged with particles of sand, and segments of small wooden cylinders, in the excavation, and evidently have been blunted by such use. The fragments of wooden cylinders are believed by Mr. Baerman to have been portions of the sockets into which the flint flakes were fitted. The round pebbles were probably used for driving the rude chisel formed by the flint inserted into the wooden socket, while the large stone hammers were used for breaking up the rock. There was no evidence that metal of any kind was used in the work. Mr. Baerman also satisfied himself that the hieroglyphs were cut with implements similar to those used in the mining. This discovery is very important, because it opens up the question as to what tools the Egyptians used in working their wonderful monuments of granite and syenite. If it were worth their while to conduct turquoise mining with flint flakes in the Sinaiite promontory, and if they used the same tools in the hieroglyphs that fix the date of these mines—and of this there can be no reasonable doubt—it is very probable that they employed the same means for the same end elsewhere, and that, to say the least, a part of their marvellously minute sculpture in Egypt has also been wrought with flint. There is no evidence that they were acquainted with the use of steel. Iron and bronze are not hard enough for the purpose. The minute and delicate sculpture left behind by the Mexicans, which can be proved to have been worked with stone tools, adds to the probability of this view.

A paper on the "Hades, Throws, Shifts, &c. of the Metalliferous Veins of the North of England," by Mr. J. CURRY, of Bolton, Eastgate, Durham, was communicated by Mr. E. W. Binney. That part of the lead mining district of the North of England to which the author's observations on vein phenomena more particularly apply is situated on the eastern slope of the Pennine chain and includes

Alston Moor, East and West Allendales, Derwent, Weardale, and Teesdale. Millstone grit caps most of the ridges in this area, but the principal strata are of the carboniferous limestone formation, and consist of alternating limestones, sandstones, and shales, with an intercalated bed of basalt (whin sill). The chief ore-bearing series of strata is stated as overlying this basaltic bed. After making a few remarks on the prevalence of veins in this area, and on their bearings and widths, he describes and illustrates the characteristics of Hades, throws, shifts, and bent positions of strata, in connection with veins. Hades are greatest in shales or argillaceous strata. It is found, especially in the Alston Moor district, that the throws and shifts are greatest at and near the surface, and that they diminish in descending into the earth. This is probably the case with the bent forms of strata. The new views contained in this paper are embraced under the consideration that the Hades, throws, shifts, &c., may have been chiefly accomplished by peculiar modes of depositing the sediments during the contemporaneous building of the veins and strata. Such modes are minutely described and illustrated by diagrams, which are requisite to convey a clear conception of the processes. The contemporaneous building of the veins and strata is assumed as commencing from straight fissures on the anticline floor at the bottom of the ocean. Such fissures are viewed either as occasioned by real breaches of the solidified granite or as effected partly by interchanges between the internal heat and that on the bed of the ocean. The heat eliminated from these fissures, and from the fissure-like vein structures, gives rise to a series of marine currents, that control the sedimentary deposits in such a manner on the sides and on the tops of the building vein, as to produce the varied phenomena connected with Hades, throws, shifts, and bent positions of the strata. In a brief abstract, the author's ideas respecting the causes productive of the vein phenomena under question cannot be satisfactorily shown without the aid of diagrams, but the following may suffice. Veins in general most probably take the directive tendency of their Hades from and in agreement with the original fissures from which they build. Thus, one building from a fissure, which has a north and south course, and which Hades over to the east at the top, may in all likelihood continue Hades over to the east during its upward construction. While building during the deposition of a shal stratum the eliminating heat will, at the top of the underlying cheek, show much force, by driving the loose light particles back, and consequently cause the aggregating mass to form and face back from the perpendicular. Should the next be an arenaceous deposit, then the sedimentary particles would be heavier, so that the power of escaping heat at the top of the underlying cheek would not be so effective in forcing them back, therefore the face of the aggregating arenaceous mass would form nearer the perpendicular. Thus the different Hades in the varied deposits may be accounted for. Throws are described as being due to a thicker deposit taking place on one side of a vein than that on the opposite side. The north and south vein, just cited, will answer to show the mode of explaining the throws. The rising of heated water from the top of the fissure would not only oppose the falling of the sediments, but would collect and carry them upwards and away from the perpendicular to the east. The sediments thus gathered and lifted would fall on the underlying side of the fissure. Under such conditions, the underlying side would build up faster than the overhanging one, and would, after a period, continue deposition, at a higher level. This higher level of the underlying side is in agreement with a very general law respecting metalliferous veins and faults. Thus, throws may begin at nothing, in deep lying rocks, and continue to augment upwards until they ultimately become very considerable. Shifts and bent positions of the strata, like the throws, are considered as beginning from nothing, and as being mostly accomplished during the contemporaneous building of the veins and strata. Without the aid of diagrams, the author's ideas cannot be explained in the mode of evolution; but the most noteworthy characteristic conditions are the powers of evolving heat along the courses of the several veins, and the agencies of numerous complex marine currents.

HOW THE COAL AND THE STRATA AROUND IT WERE FORMED.

Mr. A. H. GREEN, M.A., F.G.S., of the Geological Survey of England, read a highly interesting paper, on Tuesday evening, at the Barnsley Naturalists' Society, "On How Coal and Other Strata Around it were Formed." Mr. Green commenced by remarking that the earth and its crust were much older than was generally supposed, and that in looking at the formation of the strata it was something like a person examining the ancient stones in a churchyard to see what persons formerly resided in the locality, what were their peculiarities, and to what period of life they lived, &c. Similar to that was the history of the crust of the earth, which it was the business of the geologist to unravel, and make known. In giving a short chapter of that history the author would understand that the rocks of the earth included the coal measures. Sand and shale, or bind, and coal, with a peculiar description of clay, were found together in connection with each other. The rocks were formed beneath the sea, with sand, and mud, and coal. Sandstone was formed of nothing but sand, formerly loose, but subsequently compacted into solid stone, and shale, or bind, was finely-formed mud, which sank to the bottom in layers. Sand being a heavy material, when it was brought by the rivers to be deposited it was by a strong current, so that the sand when it came into still water that the strong currents tended to throw it into layers as it was now found, the layers sloping one over the other, and being thinner at one end than at the other. Shale being composed of finely-formed mud, extended over a larger area than the sand, and consequently in more level layers, something like the leaves of a book. Rivers running in opposite directions, and bringing the sand with them, caused the latter to be thinner at one part than the other. With regard to coal, it was pretty certain that the coal fields of Yorkshire, Lancashire, Derbyshire, and Warwickshire, as well as others, were all connected together, and stretching up, in all probability, to the Scotch coal fields. In Ireland a large part of the country had been covered with coal, of which patches still remained. He believed that a strip of dry land extended to Scotland and North Wales, and in all probability to England, and so connected them together. There was no doubt whatever but what coal was a vegetable matter, and that the seas running from Sweden, Norway, and from other poles, brought the trees and plants which were found in connection with it. Chemically speaking, peat contained 50 per cent. of carbon and 45 per cent. of gaseous matter; lignite (brown coal), 70 per cent. of carbon and 30 per cent. of gaseous matter; pit coal, 80 per cent. of carbon and 20 per cent. of gaseous matter; and anthracite (being heavy coal), 95 per cent. of carbon and 5 per cent. of gaseous matter. It would thus be seen that wood could be converted into coal by its parting with a certain portion of its gaseous matter. It was the wood, then, which became coal, and at present roots were found in the spavin or under-clay which, on being examined, were found to be those of the stigmara, the trees which grew in the coal measure period. At the present time some such growth was taking place, and which would ultimately become beds of coal. In what was known as the Great Dismal Swamp in Virginia, as well as in other swamps, there was the same stuff—the same decomposed vegetable matter, and the shales formed by the fine mud. Upon that mud trees grew and flourished (not under the sea) upon the land, which became dry, or nearly so. Then the trees grew and died, and falling, became a vast pile of vegetable matter, which formed into coal. The trees again grew, and fell, followed, perhaps, by a bed of sand. The current was not sufficiently strong, perhaps, to carry sand, but mud was conveyed to where the decomposed vegetable matter had fallen, so that the same process of wood decomposed being covered with shale, and trees growing and falling, went on again and again. Then more thick masses of vegetable matter became so many beds of coal. The reason for coal not being found in other places was, no doubt, caused by upheavals and by the action of the sea, so that now they lay only a small portion of the coal measures, which at one time extended over a vast area of ground in the kingdom. In answer to some questions, Mr. Green said there was very little doubt, or at least it was highly probable, that all the formations up to the chalk existed at the same time as the coal formations, but were renewed by denudation. The Scotch Highlands and the mountains in Wales, as well as the high grounds in other parts of the country, most likely were also high districts in the time of the coal formations. It was evidently a mistake that, as was generally supposed, intense heat was required in forming coal, which, in fact, required a great deal of moisture. In the South Yorkshire district there was the well-known Barnsley seam, 9 ft. thick, but in which there were actually six distinct beds, which could be separately traced, showing six distinct and separate growths, with an interval between each. Mr. Green further stated, in answer to a question, that had the coal itself been drifted it would have been mixed with sand and mud, which was not the case, whilst the stigmara, from which the coal was grown, was found in the under-clay. A cordial vote of thanks to Mr. Green for his highly interesting paper was unanimously agreed to.

CORNISH PUMPING ENGINES.—The number of pumping-engines reported for Nov. is 20. They have consumed 1225 tons of coal, and lifted 8½ million tons of water 10 fms. high. The average duty of the whole is, therefore, 46,700,000 lbs., lifted 1 ft. high, by the consumption of 112 lbs. of coal. The following engines have exceeded the average duty:—

Chiverton Moor—70 in.	Millions	54.0
Great Work—Leed's 60 in.		52.9
North Wheal Crofty—Trevenson's 80 in.		52.2
Providence Mines—40 in.		48.5
South Wheal Frisco—Merrill's 75 in.		54.4
West Wheal Seton—Harvey's 85 in.		59.2
Wheal Seton—Tilly's 70 in.		51.3
Wheal Seton—Tregonning's 70 in.		68.9

MINING LITERATURE.—The annual "Transactions" of the Mineral Association of Cornwall and Devonshire has just been issued, and is worthy the attention of all engaged in mining pursuits. In addition to the record of the progress made by the association during the year, there are many valuable papers on practical subjects. Mr. Robert Hunt, F.R.S., contributes a paper on the Mineral Productions of Cornwall and Devonshire. Dr. Le Neve Foster gives a translation of Mr. N. Pellissier's account of the Mine and Smelting Works of Agordo; and amongst the other papers are—A Walk in a Cornish Valley, by J. H. Collins; a Ramble through Wheal Buller, West Basset, and South France, by A. K. Barnett; a Ramble of the Redruth and Carrarack Classes through part of the Parish of Gwennap, by W. Terrill, jun.; on an Improved Piston for Steam and other Engines, by T. E. Martin, with wood-cuts; on an Exhausting Air-pump for Mines, by S. L. O. New; Notes on the Cornish Gold Diggings, Venezuela Guayana, by Dr. L. O. New; on a New Apparatus for Determining the Weights of Small Buttons of Gold and Silver, for the use of Assayers, by Charles C. Rigger; and other papers. The Transactions will be forwarded from the Mining Journal Office on receipt of 15 stamps.

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